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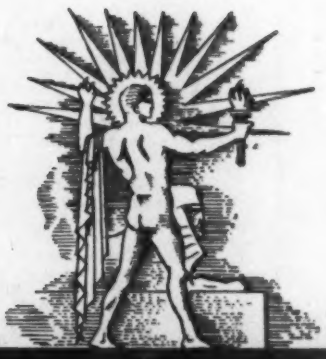
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 16, 1935

The Ducks Come Back

See Page 106

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VOL. XXVII *No. 723*

The Weekly Summary of

Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

Germany, Scotland, and England are all waging war on muskrats.

An aviator made a flight in Alaska, January 1934, when the thermometer was 71 degrees below zero.

Old Spanish records show that the Navajo Indians were making and selling their famous blankets about 200 years ago.

Chile's nitrate industry has strongly revived in the past year, since foreign supplies of nitrate have dwindled and the demand increased.

A British company has produced a plastic material from which to make transparent, colorless dishes and other objects, attractively engraved in glassware patterns.

The Government is considering the advisability of quarantining Connecticut, New Jersey, and New York to prohibit elm trees or elm wood products from being moved out of these states, in an effort to stop the spread of the Dutch elm disease.

Aluminum finished by a new process has greatly increased reflecting properties.

Holland's Noord Zee Canal has navigation locks bigger even than those of the Panama Canal.

Metallic wall paper may be a heat-conserving device, it appears from tests made with metal foil.

Smallpox caused over one-eighth of the blindness in Europe before vaccination became general.

The life of a paint film depends not only on the composition of the paint, but also on the wood surface it covers.

Why certain animals sleep through the winter is not completely understood: lack of sugar in the blood is one possible explanation.

The Bixby collection of 10,000 nut trees, on Long Island, has been acquired by the Government and the trees are being transferred, chiefly to parks and experiment stations.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

ARCHAEOLOGY

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BIOCHEMISTRY

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BOTANY

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ICHTHYOLOGY

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What is the best "spiegel"? p. 105.

PHYSICS

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PHYSIOLOGY

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PUBLIC HEALTH

Is meningitis likely to spread from transient camps? p. 100.

ARCHAEOLOGY

Key to Mayan Writing Found In Long Forgotten Book

An Unknown Spaniard Wrote Booklet 300 Years Ago Giving Meaning of 40 Mayan Hieroglyphs

THE key to the hitherto undeciphered Mayan writing, America's greatest prehistoric mystery, was handed to science by Prof. William Gates of Johns Hopkins University.

The Rosetta stone of the Mayan hieroglyphs now revealed is a three hundred year old booklet by a forgotten Spaniard. In it are 40 Mayan signs translated into Spanish.

Now archaeologists expect to go to the famous unread Mayan stela or calendar monuments that dot Yucatan and other Central American areas, and begin more successfully to unravel their unread history. Dates and figure signs have been known in the past, but the writing has remained tantatizing uncertain.

Among the 40 Mayan hieroglyphs identified by the Spaniard are:

Light, life, hunger, treasure.

The booklet, just published by the Maya Society, is by a Spaniard named R. Gomesta who lived at the end of the sixteenth century in Yucatan. A statement in Gomesta's own handwriting in his book declared that he possessed ancient Indian hieroglyphic books and that native friends had interpreted them for him.

The booklet vindicates Bishop Landa, sixteenth century Spanish prelate in Yucatan, of the charge of perpetrating a hoax, that some have held against him.

The Bishop gained his greatest historic moment when he ordered all the Mayan books gathered and burned in a great bonfire. Only three of these literary treasures escaped the flames, for modern science to study.

The suspected "hoax," which Landa left to posterity, was an alphabet of letters supposed to be a key to Mayan writing. The alphabet letters of Bishop Landa's key looked like Mayan script, but they seemed to have no meaning, and could not make readable the mysterious carvings on the stone monuments of Yucatan nor the three surviving Mayan books.

That the Bishop was not faking his knowledge of Mayan writing is suggested by the discovery that Gomesta uses a few "letters" identical with those of Landa's "alphabet" and explains how to write with these "letters" the name of the Plumed Serpent god, Kukulcan. This would indicate that the style of writing recorded by the Bishop was actually in vogue among Mayan Indians of Yucatan in the days of the Spanish Conquest in the sixteenth century. It is possible that the Landa system was a degeneration of the old classical writing on carved monuments of the old Mayan cities.

The Gomesta manuscript explains another point moot among archaeologists. A certain Mayan god, whom scientists have merely lettered as "God B," for want of positive knowledge of his identity, is explained to be the great Itzamná, god of life, and not Kukulcan, the Birdsnake.

The document directs important facets of light upon many other points, and contains some bits of strange and curious lore. There is, for instance, a recipe for making ointment from gum and tiger-grease to put on women sacrificial victims destined for the Sacred Well of Chichen Itza, in Yucatan. This unction was to keep their bodies from swelling afterwards in the sacred waters.

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"ROSETTA STONE"

This page from a 300-year-old book by a forgotten Spaniard in Mexico promises to afford a key to the secrets of the ancient Mayan hieroglyphic writing.

BIOCHEMISTRY

Auxin, Promoting Growth Of Plants, is Synthesized

AUXIN, the inner secretion of plants that makes cells grow, has been produced synthetically at the California Institute of Technology (*Nature*, Jan. 19). The work was done by Drs. Kenneth V. Thimann and J. B. Koepfli, of the Institute faculty.

Drs. Thimann and Koepfli followed a "lead" provided by an earlier investigator, who had shown one of the active growth-promoting substances to be the same thing as the complex organic compound known as beta-indolyl acetic acid. They prepared this in the laboratory, and tested it on properly prepared young plants. The synthetic substance worked as well as the natural, causing both cell elongation and the growth of new roots.

Further evidence of the versatility of auxin, in promoting another kind of growth, was reported to *Nature* by two Oxford University botanists, Dr. R. Snow and B. LeFanu. They found that the same substance in leaf-extract that caused roots to grow also promoted marked growth in thickness of young stems by stimulating the cambium, or layer of growth-cells that ensheathes stems under the outer bark or skin.

The two Oxford botanists, however, cautiously record some question whether the cambium-promoter is identical with auxin. They are continuing their researches, with this question in mind.

There are three known kinds of auxin, according to Dr. F. W. Went of the California Institute of Technology. Auxins A and B are very much alike in chemical makeup; auxin C differs somewhat from them. But all three are active in promoting plant growth. Dr. Went, together with his father, Prof. F. A. F. C. Went of the University of Utrecht, Holland, was a pioneer in the study of auxin action.

Science News Letter, February 16, 1935

The working career of a horse is estimated at about 15 years.

PHYSIOLOGY

Loud Noise Damages Part of Ear Not Used to Hear Tones

That Part of Organ of Corti Injured By Loud High Tones Does Not Pick Up Faint Tones of Same Pitch

LONG exposure to loud noise, such as boilermakers experience in the course of their work, causes deafness by damaging part of the hearing apparatus, known as the organ of Corti. Strangely, however, the part of the organ most damaged by loud high-pitched tones is not the part which picks up faint sounds of that pitch, a group of investigators at Harvard and Clark Universities have found.

The investigation which gives new knowledge both of a cause of deafness and of the little understood mechanics of hearing was made by Drs. Hallowell Davis, Moses H. Lurie, Morgan Upton and Arthur J. Derbyshire, of Harvard, and Dr. Edward H. Kemp, of Clark.

The intensity of the sounds necessary to cause damage is sufficient to cause definite discomfort in the ears of a human listener and to cause his ears to ring afterwards. It might be compared to that of a steam whistle or riveter at a distance of a few feet. The power of such tones in physical terms is some 10,000,000,000 times that of the faintest corresponding tones which the human ear can hear.

Because cats and guinea pigs could not tell the scientists just when they stopped hearing tones, the electrical currents generated in their hearing apparatus were tapped somewhat as a telephone conversation is tapped by a lineman splicing a wire from the phone line to his earpiece. In the case of the cats and guinea pigs, the organ of hearing was connected to an apparatus which amplified the currents originating in it and carried these to a cathode ray oscillograph which wrote in light on a fluorescent screen a wavy line corresponding to the fluctuations in the current from the ear.

The sensitivity to sound intensity of normal cats and guinea pigs as determined in this way corresponds quite closely to the normal human audibility curve, the Harvard and Clark investigators found.

The cats and guinea pigs were exposed to sound of varying degrees of loudness for varying lengths of time. With the electrical set-up, the point at which they lost sensitivity to the sound and could not hear the tones was determined in each case. As a check, the tissues of their hearing apparatus were then examined under the microscope for signs of damage.

The results indicate that frequency (pitch) of a tone as well as its intensity (loudness) may be an important factor in determining whether or not it will damage the inner ear, the scientists reported, the tone of 2500 cycles per second (about an octave above high C) being more effective than 600 cycles per second (a tone and a half above middle C).

Considerable individual differences in susceptibility were also indicated. Intense exposure may sometimes cause extensive damage to the inner ear and correspondingly great loss of hearing, it appeared. Some of the cases in which the damage was moderate and localized gave information suggesting that a certain part of the hearing apparatus picks up tones of a certain range in pitch, thus shedding light on a highly complex problem which scientists have not yet settled to their satisfaction.

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PUBLIC HEALTH

Advise FERA on Meningitis In Transient Camps

THE U. S. Public Health Service is advising Relief Administration officials on measures to reduce the hazard of meningitis outbreaks in transient camps and shelters, it was announced following reports that such outbreaks had occurred in camps in Washington, D. C., and at Fort Eustis, Va. The health officials are not yet ready to make public these measures.

The disease is not likely to spread from these camps to the rest of the population, public health officials said, though there may be more cases of meningitis throughout the country this winter than usual.

Comparison of the prevalence of the disease now and in past years shows that there is very much less meningitis now than there was in 1928, 1929 and 1930 but slightly more than in 1932, 1933 and 1934. For the week ending Feb. 2, the latest on which figures are available, 127 cases were reported to the U. S. Public Health Service by state health officers.

While epidemic meningitis is a relatively rare disease, it has been fairly prevalent all over the United States during the past few years. It is known to public health authorities as one of the seasonal diseases, which means that it is more prevalent at some times of the year than at others. In the temperate zone, in which we live, it is most prevalent during winter and spring, reaching a high point in March.

Meningitis is an inflammation of the membranes covering the brain and spinal cord. This inflammation may be caused by various types of infection, such as tuberculosis, pneumonia, streptococcus, etc. The type known as epidemic meningitis is caused by an organism called the meningococcus.

Epidemic meningitis is spread chiefly by healthy carriers who carry the meningococci in their throats and noses. Theoretically, the way to check meningitis would be by isolating all the carriers. This was found to be impractical—in fact impossible—during the World War, when the disease broke out among the soldiers, because the germ may be carried by one person today and by another tomorrow.

Crowded living conditions, such as exist in tenements, in barracks during war time, or sometimes in the steerage of ships, are particularly favorable to the development of epidemics of meningitis.

Sometimes a patient suffering from the disease gives it to others. This must be guarded against by isolating the patient and disinfecting.

Meningitis usually starts suddenly, with more or less severe headache and fever. A very characteristic symptom is the backward bending of the head, which is held rigidly in this unusual position.

Examination of the fluid within the spinal cord for the presence of the germ is the only way of making an absolute diagnosis of epidemic meningitis. For this purpose the fluid is drawn through a needle. The operation is not dangerous and does not cause much pain.

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CHEMISTRY

Giant Egg-Shaped Molecules Seen With a Microscope

Discovery May Make Possible a Really Successful Synthetic Rubber With Moiecules 8 Times Present Size

EGG-SHAPED molecules so large that they may be seen with a microscope—the first time any molecule has been seen with such apparatus—have been discovered at Urbana, Ill., in the X-ray laboratory of the University of Illinois.

A molecule is the smallest subdivision of a chemical compound in which its chemical properties are maintained.

Scientists are hailing the new find as the foundation for a really successful synthetic rubber. It is believed present day synthetic rubber-like products have been made erroneously on the basis that rubber molecules each weighed 68,000 times as much as a hydrogen atom. The new super-giants of the molecule world weigh 500,000 times as much as hydrogen atoms; over seven times as large as science's estimate of rubber molecules.

Yet the new giants are just at the limits of the microscope. They are six one-hundred-thousandths of an inch long.

Prof. George L. Clark of the chemistry staff and pioneer in industrial X-ray work made the discovery of the giant molecules. Their presence had been indicated by observing the fashion in which they bent, or diffracted, X-rays but only now have they been isolated for microscopic observation.

Botanists have known for years that the basic structure of cellulose and plant products consisted of little crystalline particles linked endwise. These structures could be seen in a microscope and were made up of the giant molecules.

The reason for failure of science to see the actual molecules before, Prof. Clark states, was that they were embedded in a jelly-like substance which had not previously yielded to any breaking down process.

The value of the new discovery for rubber-making in laboratories lies in the fact that no substance can be man-made until its exact molecular weight is known and used in the manufacture.

From the discoveries of Prof. Clark it appears, therefore, that rubber chemists need to make a rubber molecule nearly eight times as large as those with which they have been working.

Man-made molecules of such enormous size have not yet been produced in the laboratories. Few people even suspected that such large molecules could exist. Prof. Clark's work shows that in plants these giants are possible.

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AERONAUTICS

Hot-Air Balloon "Lifts Itself By the Bootstraps"

BALLOONS that "lift themselves by the bootstraps" may soon join gliders as popular sports air-vehicles in Germany. A Vienna-born aircraftsman, Rudolf Brunner, has revived the almost extinct hot-air balloon by means of a heating apparatus that can be carried aloft in the basket and continue to pour hot air into the bag in exactly regulated volume, making for easy control of its lifting power and eliminating the need for ballast. (*Die Umschau*, Jan. 20).

Hot-air balloons were the first form of aircraft that ever successfully left the ground, carrying human passengers. They were in wide use as spectacles in the late eighteenth and early nineteenth centuries, but with the invention of balloons lifted by hydrogen and other light gases they passed virtually out of the picture, being relegated to small fairs in the rural regions. Their "jumps" were necessarily short, for as soon as the initial supply of warmth in them passed out, they had to come to ground.

Herr Brunner's "bootstrap" invention consists of a simple type of burner which it is said any tinsmith can put together. The fuel is crude oil. A pipe carries the burner up to the bottom opening of the balloon, and the spreading-ring there prevents the fabric from coming within igniting distance of the flame. Valves regulate the flame to any desired height, and thus control the lifting power of the heated air.

The balloons used by Herr Brunner are small, carrying only one person and the heating apparatus. It is not expected that they will have any usefulness outside the field of sport, but since one of them can be operated for about five marks (about $2) per flight-hour, this means of getting aerial thrills may be within the reach of persons of moderate financial status.

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GEOLOGY

Dr. David White, Geologist, Dies During Sleep

DR. David White, noted Washington geologist, died in his sleep during the night of Wednesday, Feb. 6. He had been in ill health for some time, though he had continued to work steadily until a few days before his death.

Dr. White was special geologist of the U. S. Geological Survey, associate of the Smithsonian Institution, and a trustee of Science Service. He had also held offices in the National Academy of Sciences and the National Research Council, and was a research associate of the Carnegie Institution of Washington. He was a specialist in the study of records of life in the most ancient rocks.

Dr. White was born at Palmyra, N. Y., in 1862, and held degrees from Cornell University, the University of Cincinnati, the University of Rochester and Williams College. Dr. White's paleontological interests were practical as well as "pure" science. A substantial sector of his international reputation rested on his knowledge of coal and petroleum geology.

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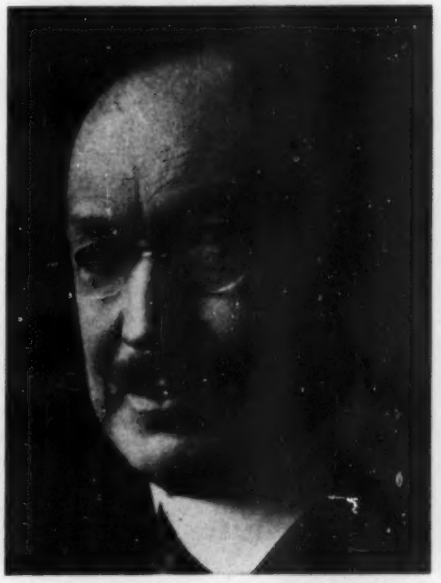

DR. DAVID WHITE

MEDICINE

"Green Germ" of Ceylonese Malaria is New Species

CEYLON'S "green germ" malaria, which has swept disastrously across that once ideal island, is still a mystery disease to the U. S. Public Health Service. The emphasis on the green color of the causal parasitic cells appears to be the distinguishing characteristic that would set it up as a quite new malarial species.

The three well-recognized species of malaria "germs" already known also have pigments; but two of them are described as dark brown to black, and the third as light brown. The darkest of them, the species causing the quartan or "four-day" type of malarial fever, is described by some observers as "greenish." But, noted Dr. Louis L. Williams, Jr., of the U. S. Public Health Service, "if the British medical men on the island, who are exceedingly competent in the malarial field, describe the present form as 'green', it is not likely that they are confusing it with any of the already known species."

All forms of malaria are caused by one-celled animal parasites, of the genus known to scientists as *Plasmodium*. There are three well-recognized species, and a number of varieties of less certain distinctness. Of the three known species, one causes quartan fever, one tertian fever, and one a most virulent type of tertian or three-day fever which because of its seasonal nature is called aestive-autumnal, or summer-and-fall fever.

The parasites causing all malarias pass through a most complicated life cycle, partly in the body of the human victim, partly in that of the carrier mosquito. In the human blood they attack the corpuscles, breaking them down as they themselves multiply. Because of this peculiarity, the most marked of the many disagreeable effects of malaria are seen in the blood itself and in the organs where blood plays an important role, especially the spleen, the liver and the red marrow in the spongy parts of the bones. In the especially vicious attacks of pernicious malaria that end in death, it is often found that so many of the red blood corpuscles are broken down that the tiny capillaries are choked with their debris. In other cases, death seems to result from simple massive poisoning from a toxin secreted by the parasites.

The present terrific epidemic in Ceylon is not without precedent in that part of the world. In the Punjab, in northern India, Dr. Williams told Science Service, more or less localized epidemics break out at intervals of a few years, seldom occurring twice in the same region. In these epidemics it is not uncommon for 65 per cent. of the population in the affected area to be attacked; and of the sick, sometimes a third or more will die. This is much more severe, though less extensive, than the present Ceylon epidemic where about a sixth of the total population are ill, with deaths of only one in a hundred.

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PHYSICS

Quick Photographs Possible With New Ignitron Tube

TO DEMONSTRATE the rapidity with which it is possible to start high current electric arcs, engineers of the Westinghouse Electric and Manufacturing Company have used their new ignitron tube to "stop," photographically, the motion of a rubber ball fired from an experimental gun at a velocity of 240 miles an hour.

Dr. Phillips Thomas, research engineer, is demonstrating the experimental apparatus consisting of the special gun, a rubber ball bullet, a rubber tube enclosing a fine wire and the special ignitron tube control.

Impact of the rubber ball on the rubber-enclosed wire broke an electrical current which caused a powerful flash in the ignitron tube of 1,000 amperes for one millionth of a second. By the light of this mercury flash the ball was photographed, as shown, in contact with the rubber tube and wire. At the instant of photographing the stretch of the rubber tube was local around the fired ball. The ball, in the picture, is moving from left to right.

In engineering practice the ignitron tube is used to start powerful electric arcs in lines carry enormous currents.

The interior of the tube contains mercury vapor which has high current carrying capacity when in use. A tiny current in the tube flashes on the arc within the tube, which in turn carries the large currents.

The demonstration was performed to show how promptly such tubes could build up this flashing current-carrying arc.

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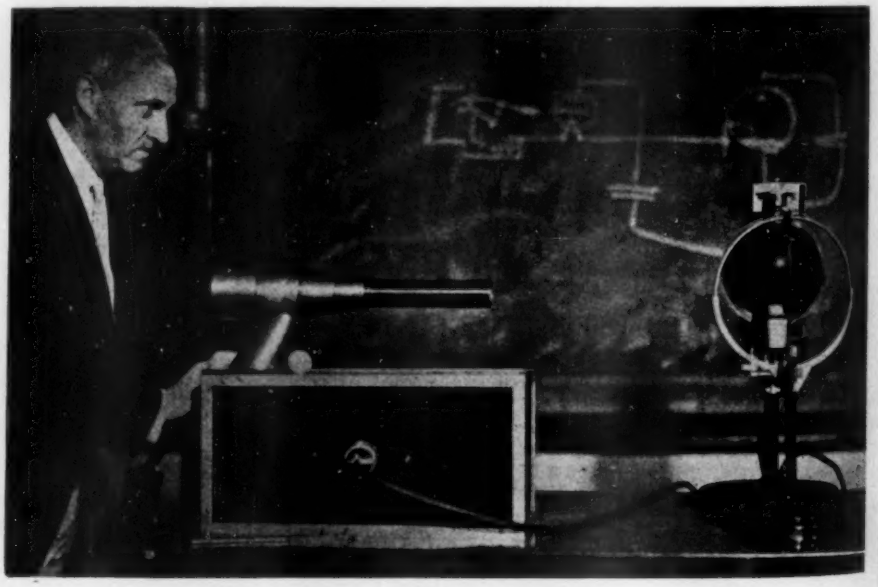

EXPERIMENTAL GUN WITH RUBBER BALL BULLETS

Dr. Phillips Thomas, research engineer of Westinghouse Elec. Co. demonstrates the experimental gun from which was fired the rubber ball at a muzzle velocity of 240 miles an hour. By breaking an electrical contact the swift motion was "stopped" and the ball photographed in flight. The test was made to prove the rapidity of the company's new ignitron tube for starting high-current electric arcs.

"STOPPING" 240 MILES AN HOUR

Ignitron arc-controlling tube of Westinghouse Elec. Co. flashes on for a millionth of a second to "stop" the motion of a rubber ball fired from an experimental gun at velocity of 240 miles an hour. The rubber bullet has struck a rubber sheet on whose surface is a wire. The breaking of the wire by the ball flashes on the new tube and makes possible the photography by its mercury vapor light.

MEDICINE

Smoking Mother Transmits Tobacco Products to Child

WHEN a mother smokes heavily before the birth of her child, some of the substance in tobacco smoke which makes the heart beat faster is transmitted to the blood of her unborn child and also makes its heart beat faster, Drs. Lester W. Sontag and Robert F. Wallace found in experiments conducted at Antioch College.

In their report (*American Journal of Obstetrics and Gynecology,* January) these physicians make no statement concerning harmful effects of maternal smoking upon the unborn child. But taking into consideration the work of other scientists on the effects of nicotine in the milk of smoking mothers, they consider it "not improbable" that maternal smoking before the birth of the child may have permanently harmful effects on the offspring.

A careful study of the newborn children of mothers who smoke heavily before their children are born is, they believe, the next step to be taken in order to reach a scientific conclusion as to whether mothers should or should not smoke while bearing and nursing children.

CHEMISTRY

Photographic Plates May Test Magneto-Optic Method

Prof. Allison Hopes New Technique Will Make Possible Objective Confirmation of His Results

NEW support for the famous, but controversial, method of chemical analysis used by Prof. Fred Allison and many of his pupils at Alabama Polytechnic Institute will shortly be presented.

The much-debated method uses the magneto-optic apparatus for making the analysis. So sensitive is the apparatus, Prof. Allison claims, that he has been able to detect the presence of the still missing chemical elements 85 and 87 in sea water. And he predicted the existence of the new "heavy water" in the more ordinary variety before Prof. Harold C. Urey of Columbia University started his researches on this strange liquid which recently won for him the Nobel Prize award.

Newest phase of the long-extended controversy will be the report from Prof. Allison's laboratory that it is possible to take observations with photographic plates and thus remove the chance of human error incidental to the system in the past when observers had to be used. This will shortly be submitted to scientific journals.

Without going into the complex nature of the apparatus, it may be said that the identification of chemical elements is made by watching changes of intensity of light coming from a spark, which passes through solutions of materials to be studied. The observer sits in darkness and watches for maxima and minima in light intensity.

By manipulating moving contacts on long wires, known as a trolley, the observer correlates these minima with positions on the track, which finally are translated into chemical analysis of great sensitivity.

How well the apparatus works, and what it means if it does work, is the cause of much argument among scientists. Prof. Allison, his former pupils and colleagues appear to obtain uniformly successful results with the equipment. On the contrary, nearly as many other investigators cannot duplicate their results and believe the apparatus "fools" the observer into predicting things which are not so.

No one doubts the sincerity of the observations but the critical school of investigators believe that one may be "fooled" by the peculiarities of the apparatus and because of psychological tricks which are encountered in observing the weak light source.

Latest of the critical reports on the magneto-optic method appears in the *Physical Review* (Jan. 1, 1935) from H. W. Farwell and J. B. Hawkes of Columbia University. They could obtain no correlation of minima when the precaution was taken of keeping the observer from all knowledge of what his guiding wheel for the trolley meant in terms of the position of the trolley.

It was suspected that unconsciously the observer, by muscular memory or some other subconscious psychological happening, could reproduce positions on the trolley track by turning the driving wheel.

Unwitting Errors

Report Farwell and Hawkes, "Observations of a single low intensity optical field produced by a spark are unreliable not only on account of physiological and psychological effects, but also because of variations in the spark discharge itself."

Prof. Allison when informed of this conclusion told Science Service:

"In recent months Dr. Hughes and Mr. Goslin of this laboratory have developed a photographic technique which is yielding results in confirmation of our claims for the magneto-optic method of analysis; namely that the minima are objective, reproducible and characteristic of compounds present in the solution. This is the first confirmation of the method that has been obtained by photographic means. They expect shortly to submit for publication a preliminary report of this work. This will constitute our reply to those who are reporting negative results."

CHEMISTRY

More Petroleum Than Drinking Water Used Here

THE United States uses twice as much petroleum as drinking water. Each day enough crude oil is pumped from the ground to cover Manhattan Island —twelve miles long and averaging a mile wide—to a depth of a foot and one half.

Thus did Dr. M. R. Fenske, director of the petroleum refining laboratory of Pennsylvania State College, describe America's enormous consumption of its oil resources.

Speaking before the New York Section of the American Chemical Society Dr. Fenske predicted that when the real nature of petroleum is finally learned by chemistry a vast field of new and unsuspected industrial uses will come.

He likened the future of petroleum to that of the "black troublesome" coal tar of a century ago which has become the basis of important dyes, explosives and drugs.

Science News Letter, February 16, 1935

METALLURGY

300,000 Pound Pressures Retard Alloy Hardening

WHY high pressures up to 300,000 pounds to the square inch help retard the rates of hardening in much-used industrial alloy metals is suggested by new research just reported by Dr. Leland R. van Wert of the Harvard Graduate School of Engineering.

Using pressures of 12,000 atmospheres, or 180,000 pounds to the square inch, Dr. van Wert found the aging rate was measurably slowed up by the squeezing force on the alloys. But the final metal hardness was not affected by the process.

During the hardening process in an alloy, it is explained, there is a migration of atoms of the alloying metal to strategic points in the atomic lattice work of the basic metal. The rate of aging depends on the rapidity with which these moving atoms can congregate or diffuse at these positions.

The accelerating effect of temperature on the process is supposedly the result of an increase in diffusion rate with the temperature rise, Dr. van Wert says.

"Thus it is conceivable that pressure's decelerating effect on aging comes about through interference with this diffusion process. High hydrostatic pressures compress the metal lattice; conceivably the 'viscosity' of, and the difficulty of atomic movement within, the solid solution is proportionately increased. Diffusion then becomes slower and the age-hardening process is retarded."

Six alloys, commercial duralumin, three aluminum alloys, a lead-calcium alloy and an iron-nitrogen alloy, were subjected to pressure tests. Most marked effects were found on the lead alloy, with the aluminum alloys next. The iron-nitrogen alloy was not affected at all even under 20,000 atmospheres of pressure.

Science News Letter, February 16, 1935

METALLURGY

World's Purest Iron Helps Experts to Learn New Facts

THE PUREST iron in the world is now being made to help science learn more about highly important industrial metal, it was reported before the Metallurgical Advisory Board to the Carnegie Institute of Technology meeting at Pittsburgh.

Dr. Cyril Wells of the Metals Research Laboratory at Carnegie Tech told attending metallurgists of the unique iron, 99.95 per cent. pure, in which the last remaining impurities are present in not more than a few parts each per million of iron.

Now being made in a special furnace about three pounds at a time, the highly pure iron has been subjected to a variety of standard tests to learn its basic properties.

Science News Letter, February 16, 1935

GEOLOGY

Insects Made Rocks, Reported in Germany

WE HAVE long been used to thinking of coral-animals, clams and oysters as rock builders; great layers of stone laid down by massive deposits of their skeletons and shells are common throughout the world. But now insects come in for their turn at world-building honors. Prof. August Thienemann of the Kaiser-Wilhelm-Gesellschaft, describes extensive rock strata formed almost entirely from the limy tubes or cases secreted by the larvae of certain water-loving species of flies. (*Forschungen und Fortschritte*, Jan. 19).

Science News Letter, February 16, 1935

IN SCIE

HOME ECONOMICS

Probe Darkening Trait Of Cut Bananas

THE DEPRESSING experience—for a hostess—of seeing an array of fresh banana concoctions turn dark and sticky before reaching the table is getting attention of laboratory investigators.

Ways and means of retarding the darkening process, which begins about half an hour after cut bananas are exposed to air, have been tested by Dr. Mary de Garmo Bryan of Columbia University and Ethel Plotz. (*Journal of Home Economics*, February). They mention these points:

Riper bananas do not darken so quickly as less ripe fruit.

The sharper the knife, the lighter the slices will remain.

Cross-slicing is most satisfactory. Longitudinal slices darken readily, and crushed bananas darken fastest of all.

"Waxed paper and Cellophane were found ineffective as covers for containers filled with banana slices."

Banana slices immersed in grapefruit juice keep light almost indefinitely. Pineapple juice is almost as effective. Both these juices, fresh or canned, will restore color of cut bananas that have darkened from air exposure. Even dipping fresh-cut slices in the juice for 30 seconds will keep the bananas light for several hours.

A solution of cream of tartar and glucose was found effective in preserving color and firmness of cut bananas, for dishes in which the flavor of pineapple or grapefruit juice was not desired.

Science News Letter, February 16, 1935

ICHTHYOLOGY

American Crayfish Found in French Rivers

THE common American crayfish, or "crawdad," has appeared in French rivers. It first developed in large numbers in the Seine, and lately has also been found in the Marne.

Science News Letter, February 16, 1935

EE FIELDS

MEDICINE

Chewing Gum Found Cause Of Asthma and Hay Fever

PERSONS sensitive to chewing gum are something new under the medical sun. Dr. A. I. Kleinman, Brooklyn, reports two cases in which sneezing, coughing and nasal and asthmatic symptoms have been traced to chicle, the substance that forms the base of all chewing gums.

Dr. Kleinman's report (*Journal of the American Medical Association,* Feb 9) brings evidence of "chicle allergy" to the attention of physicians for the first time. Probably other cases of sensitivity may now be traced to this offending substance, it is believed.

Chicle is the solidified sap from a tree that grows in Mexico and Central and South American countries. Chicle, sugar, corn syrup and flavoring oils are the ingredients of ordinary chewing gum. Medicated gums also employ chicle as a base.

Science News Letter, February 16, 1935

DENDRO-CHRONOLOGY

Oak Trees Reveal Medieval Dates in American Midwest

BY READING dates in tree rings from timbers of the Norris Basin of Tennessee, archaeologists have pushed the midwestern American tree ring calendar back to the Middle Ages—1315 A.D.

Thus, the archaeologists' dream of knowing exactly when Mound Builder civilizations flourished in the great Mississippi Valley is very near to being realized.

How this has been achieved was reported to the American Anthropological Association by Dr. Florence M. Hawley of the University of New Mexico.

Early in 1934, Dr. Hawley set out to construct a calendar of tree rings, hoping to date ancient Indian towns in the MiddleWest, as pueblos and cliff dwellings of the Southwest have been dated. In the Tennessee Valley, where timber is being cut in dam construction, Dr. Hawley and her associate, Roy Lassetter, have been able to read dates in oak and cedar trees from modern times back to 1315 A.D. This is done by applying the principle that annual growth rings in trees vary in appearance from year to year, according to the water the tree receives. Very dry years, for example, produce very narrow rings. By beginning with current, known dates and examining older and older sections of trees, and overlapping series of rings that match, an expert can make a complete calendar.

In western Kentucky the tree ring calendar has so far been carried back to 1638, Dr. Hawley reported.

With a master calendar of tree rings, the archaeologists can match dated rings with similar rings found in timbers in Mound Builder ruins. Thus, they can learn the century, even the year, in which Mound Builder Indians cut down trees to build a house or other construction in a village.

Science News Letter, February 16, 1935

METALLURGY

Find Best "Spiegel" Is 5-1 Manganese-Silicon

THE BEST "spiegel," which sounds like a new breed of dog but is the steelman's name for alloys that help deoxidize iron ore in steel making, was revealed at the meeting of the Metallurgical Advisory Board to the Carnegie Institute of Technology.

Reporting on the culmination of eight years of steel research, F. N. Speller, chairman, and John D. Beatty, secretary of the Board, indicated that a spiegel, or silico-manganese alloy, in the ratio of five parts manganese to one part silicon proves to be best in freeing iron from the grip of oxygen in iron ore.

Dr. C. H. Herty, Jr., director of research of the Advisory Board, described how manganese and silicon release free iron from the reddish iron ore arriving at the steel mill.

Both manganese and silicon are needed in steel making to break up the iron ore molecules consisting of FeO, or iron oxide.

Manganese and silicon go after the oxygen in the iron ore, seize the oxygen atom from the iron ore molecule and yield iron atoms. The 5 to 1 ratio of the two elements was determined only after the long period of research. Better steel in all its varied uses is expected from the finding.

Science News Letter, February 16, 1935

PSYCHOLOGY

Rockefeller Funds Aid Human Behavior Studies

STUDIES of human behavior and projects relating most closely to world conditions of economic and political stress had first claim to the funds of the Rockefeller Foundation during 1933, it appears from a report of the Foundation's activities for that year just made public. The sum of $9,890,806.31 was appropriated for various philanthropic projects during that year.

"In the fields of medical and natural science the major emphasis has been placed on the problem of mental health and on the development of those sciences whose advance is imperatively demanded to form the substantial scientific basis for the rapidly evolving modern science of man," states President Max Mason.

"In the social sciences the problems of economic structure and process, international relations, and community organization and planning have been considered of principal importance.

"The emphasis in the humanities has been on the encouragement of international cultural understanding and the preservation and interpretation of American culture.

"In the International Health Division, there has been increased attention to studies of disease in its environment, with closely related laboratory investigations.

"Early in 1933 a fund was set aside for projects having to do with the present national and world situation. The projects which have been supported fall under two general headings: studies providing for concurrent appraisal and studies furnishing a factual basis for improved planning of important sections of the recovery, relief, and reconstruction program; and undertakings involving the collaboration of private agencies in the prosecution of the emergency programs of the federal, state, and local governments.

"Another emergency requiring special funds was the displacement of eminent scholars in Europe for political reasons and the consequent interruption of important scientific work. Dealing directly with universities in Europe and America which wished to add these men to their staffs, the Foundation has contributed toward their salaries. The situation was an emergency; the solution of the problem is as yet temporary."

Science News Letter, February 16, 1935

CONSERVATION

Saving the Ducks

Intelligent Action at Last Being Taken to Save Diminishing Wild Life From Complete Extinction

By DR. FRANK THONE

See Front Cover

WILD ducks, flying northward this spring toward their nesting grounds, will sail over a land that has been dedicated to a New Deal for them and for all their wildlife neighbors in feathers and fur. Not only the "forgotten man" is getting some kind of a break, but also the hunted and harried bird and beast. The Government is "doing something for ducks."

It is high time, too. Our national assets of wildlife are at as critical a point as were our national assets of cash and credit, in those memorable few days when President Roosevelt, remarking that what was needed was "action, and action *now*," proceeded to take drastic steps to pull our drifting economic craft away from the rocks that seemed within an inch of wrecking it. There is a run on the First National Bank of Wildlife at exactly the time when its living assets, partly as the result of past bad policy, partly through unforeseeable natural disaster, are at their lowest ebb. Something must be done, and done quickly, not merely to hold our stocks at their present poverty level, but to increase and restore them to something like their one-time opulent state. It can be done, but it must be done today and not tomorrow.

"Ding" Takes Hold

When the President moved to prop up our tottering banking structure, he used existing governmental machinery to a large extent, putting into it determined and decisive men who knew what needed to be done and would lose no time in doing it. Similarly, when the shaky state of our wildlife reserves made itself evident, an existing agency, the Biological Survey, a bureau of the Department of Agriculture, was put in charge. Or rather, it was continued in charge, for the Biological Survey always has had as one of its functions the study and conservation of game birds and animals. But it was made more efficient through a number of internal changes and innovations.

Also, it was given, as a new chief, a man of determination and decision; one who could find out what needed to be done and would lose no time in doing it. This was Jay N. Darling, better known as "Ding," outstanding American cartoonist.

It seemed rather strange to many, at first, that this primarily scientific bureau of the Government should be headed by a non-scientist, eminent though he might be in another field. But Secretary Wallace, who made the appointment, knew what he was about. He and "Ding" are fellow-townsmen and fellow-newspapermen, and in their years of contact Wallace had known intimately of the cartoonist's keen and vigorous interest in outdoor life, of his decades of leadership in conservation organizations, and of his ability to win the personal loyalty of his associates and to get things going and keep them going full steam.

Inventory and Balance

"Ding's" approach to the problem was realistic and businesslike.

"What are we going to do about it?" he asked. "First, let's take an inventory and balance our books, and where the supply is short immediately plan to restore it to a normal stock; where it is plentiful, let's find it out and benefit by it. It is entirely possible to do so without cutting in on the public or private precincts of anyone.

"There are varying opinions as to whether we have more ducks or lamentably less than ever. And the names the two debating teams call each other are something awesome. The facts to convince the opposing factions are not available. Let's get them."

So everybody who had anything to do with ducks was in one way or another drafted into service. Last fall, for the first time, a dollar Federal hunting license was levied, to obtain funds for the building up of a national wildlife domain. This license was payable by the purchase of a "duck stamp" to be stuck on the hunter's State game license. Every purchaser of a duck stamp was asked to report the number of ducks he killed. Some squawked; but all reported. Owners of "baiting grounds," where ducks are lured by food spread on the water, were given their license upon agreement that they would report the number of birds killed on their premises. State game commissions were solicited for estimates of game killed, by states.

DUCK STAMP DESIGNS

Below, drawing for the 1934 Duck Stamp, by Mr. Darling; above, design for the current year's stamp, by Frank W. Benson, well known wildlife artist.

It was not expected that anything like a high accuracy could be attained by these means, but at least some kind of an estimate could be got together. And there would be the incidental advantage of getting the sportsmen, individually and personally, into the game of "doing something for the ducks," themselves.

But even before the shooting-season census was undertaken, the Biological Survey's own field scientists were out on an even more important job. Together with informed and interested volunteer workers, they were assembling facts about the ducks and other migratory birds on their breeding grounds in the North.

Most ducks, geese, etc., rear their young in the waters that run toward the Arctic. In the Canadian North, and far up into Alaska they breed, and in the northernmost states of our own Union. Along these streams and among these

marshes and lakes tramped and paddled the men of the Biological Survey, observing, counting, taking notes, reporting to Washington headquarters.

What they found was disheartening —in some cases downright appalling. Everywhere the results of over-shooting for many years, of the destruction of feeding and breeding grounds by drainage, and latterly of several successive years of drought, were depressingly apparent.

Empty Breeding Grounds

W. C. Henderson, veteran naturalist and associate chief of the Survey, was sweeping and emphatic in his statement before an international convention of game commissioners: "Without exception, each naturalist who studied conditions in Canada found the breeding stock there insufficient to occupy the areas that are still favorable for nesting . . . The immense breeding area north of the fifty-fourth parallel is beyond the drought zone and is largely in its primeval state, well-supplied with food, and unvexed by settlement, agriculture, or drainage. Its only need for waterfowl production on a vast scale is an adequate breeding population."

And the breeding population was not there. Mr. Henderson quoted one of his own associates, Edward A. Preble, who has known the Canadian duck country for a third of a century. Mr. Preble reported from the field that the territory is now not more than ten per cent occupied.

The depleted waterfowl population has had a new and extremely dangerous drain imposed during the past summer of great drought, the Survey's field workers found. The worst of the drought area, covering the northern part of the Great Plains in this country and the southern prairie provinces in Canada, contains at least parts of the breeding grounds of most waterfowl species. The Biological Survey prepared a series of maps, vividly outlining the situation. On the outline of the continent, the breeding ground of each species was laid out in cross-hatching. Over this, the area where drought prevented nesting for that species last summer was covered with solid black. The black zones of death blot out anywhere from a fourth to a half the total possible breeding range of some species; and no kind of duck is shown as having wholly escaped this black excise.

DISTRESS SIGNAL

"Ding" Darling, head of the Biological Survey, is not only an able administrator but an effective propagandist for his cause.

South With the Ducks

The Survey field men did not consider their research at an end when the diminished squadrons of ducks flapped southward last fall. They followed them. To the lagoons of Texas, to the marshes of Louisiana, to the reedy lakes of Florida, even to the distant peninsula of Yucatan they followed them, and there they are with them now, still observing, recording, reporting back to headquarters. By the time the ice breaks on northern rivers, and the alders and pussy-willows blossom into the chill early spring air up in Canada, Uncle Sam will know more about his flocks of wild ducks and other fowl than he has ever known before. He will be able to do something about it, with intelligence based on information.

What *can* be done about it? Several things. If present shooting seasons are at the wrong time, or too long, or allow too large a bag limit, regulations can be changed. If on the other hand the claims of some men are true, that there are surpluses of ducks at least in some parts of the country, then the restrictions can be relaxed a bit, so long as the kill is not allowed to exceed the reasonable expectable increase through breeding.

That sort of thing of course has been done for a long time, though never with as much information as is now being accumulated. But it is not enough. Regulating the killing of ducks does let larger flocks go through toward the breeding grounds, and if those breeding grounds are in the Far North, all is well and good. But if you have a species that has its natural habitat in a region now largely cultivated or exploited for timber, all is not so good. As "Ding" saltily remarked on one occasion, "Ducks do not lay eggs on farm fence posts."

In the days of our enthusiastic expansionism in farming, something like seventeen million acres of marsh, lake and river-bottom land in the North-Central states were drained and turned into plowland. They produced no more wild ducks or any other game. Last summer, when the drought was at its height, farmers on some of those drained lands went out shooting. They were not shooting ducks. They were shooting their own cattle, to spare them the agony of death by thirst, in a region that once had plenty of water. It was one of the bitterest scenes of the whole bitter drama of our national misuse of land.

The proposal is to get some of that land back into at least a semblance of its natural state. With emergency funds made available at the outset, and augmented now from the proceeds of the "duck stamps" and other sources, a million or more of those seventeen million drained acres, unprofitable, submarginal farm lands now, are being purchased and turned back into marsh and lake. The buying is being done without shouts or trumpeting, and the areas under consideration are kept confidential, lest real estate speculators, who profited by luring the farmers into them, profit again by forestalling Government purchasers and getting the farmers' options first, to hold for a fancy price. But the purchase of the land to give back to the ducks is going on steadily, and the ducks quack aloud for joy.

Not For Ducks Alone

This giving the country back to the ducks is not for the ducks alone. Not even for their companions, the other migratory waterfowl. They are important enough in themselves, but they are also symbols, representatives. They hold proxy for the non-migratory upland birds as well, and for the fur-bearing animals of all places and all degree. Their winnings will be shared by grouse and bobwhite, by wild turkey and deer, by beaver and muskrat, by martin, mink and badger, even by that socially shunned but nevertheless valuable citizen the skunk. In doing something for ducks, the Biological Survey is doing something for all wildlife.

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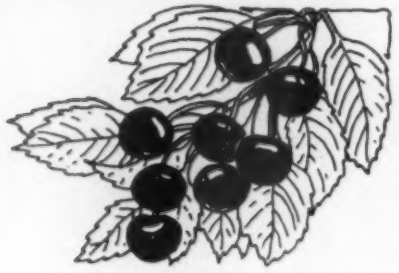
BOTANY

NATURE RAMBLINGS

by Frank Thone



A Tree-Planting President

FRANKLIN Roosevelt, tree-planter on his own land and encourager of forestry on the lands that belong to all of us, follows early and eminent precedent. For America's first chief magistrate was also, in his time, an indefatigable planter of trees.

Washington loved trees. When he took command of his army at Cambridge, he chose to stand under a mighty elm, which died of sheer old age only a few years ago. At a number of places where he wanted to leave mementoes, he planted trees. It is recorded that on his estate at Mount Vernon he was always impressing upon his overseers and servants that trees are living things, and as much entitled to decent treatment as human beings.

The plantings at Mount Vernon are justly famous, and some of the trees there go back to his time—several even to his own hand. Erle Kauffman, recorder of the Washington trees, states that at Mount Vernon there are still standing, of his own plantings, seven ash trees, two tulip trees, four buckeyes, four elms, three pecans, thirteen holly trees, three coffee trees, two lindens, two beeches, three box trees, one hemlock and one mulberry. He planted trees literally in thousands, both on his own land and elsewhere.

Trees for shade and ornament were not Washington's only care. The list of fruit tree plantings recorded in his systematically kept diary is impressive. And as if in atonement for the legend of his one childhood fit of destructiveness, he seems to have made special favorites of cherry trees. His journal records varieties no longer known, or recognizable conjecturally by some similarity in name: Summer Boon, Winter Boon, Bullock Heart, May Duke, Black May, May Heart, Carnation. Pears also were favorites, and apples and plums, too. Nut trees he mentions frequently, and smaller trees prized mainly for their flowers, such as service-tree and redbud.

Washington was withal a careful farmer, and took every advantage of the best agricultural science of his day. He knew the value of crop diversification, of fertilization, of erosion control. Neatly bound volumes of farm journals still stand in rows on the library shelves in his old home: he read them as diligently as the modern farmer reads the publications of Wallace or Capper.

During the Revolutionary War, the elegant British officers (who were always boasting how they were going to capture him—tomorrow) used to mock at him as "Farmer George." If they had remembered a scrap of the Greek that as young gentlemen they were supposed to have learned at Cambridge and Oxford, they would have recognized the redundancy: "George" in the classic tongue means farmer—literally, "earth-worker"; and George rejoiced in the title.

Science News Letter, February 16, 1935

The larva of the Goliath beetle of Africa sometimes grows to be six inches long.

FORESTRY

Fire in the Forest Not Always a Devil

FIRE in the forest is not always and everywhere a red devil of destruction. Facts and viewpoints presented at the annual meeting of the Society of American Foresters in Washington make it appear that Southerners, in following the old Indian custom of burning off the dead grass and underbrush in the woods early in the spring, have been carrying on at least a rough approximation of good silviculture.

In acknowledging this, the foresters have done a handsome thing; for until quite recently it has been the fashion in professional forestry circles to denounce and wring the hands whenever Southern woods-fires were mentioned.

The Southern countrymen had no particular notion of burning the woods for the benefit of the trees. They were after a quicker crop of fresh grass for their cattle, just as the Indians before them were interested in grass for the deer they hunted.

But scientific observations, mostly under control conditions where comparison with like unburned areas is possible, have shown that within reason fire is a good thing for longleaf pine, most prized of Southern trees. This species is fire-resistant in all except its first few months of life, because of its thick bark and its trick of protecting its all-important "leader" bud with a close bundle of leaves. Fire kills less valued competing pines and hardwood species, and lets the young longleaf trees grow.

Fire, it has also been found, helps the longleaf seedlings against one of the most serious of pine diseases, the brown spot of their leaves. In one experimental area, young pines kept wholly protected from fire showed twice as much of this infection as did trees of sim-

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RADIO

Tuesday, February 19, 4:30 p. m.

MENTAL HEALTH, HAPPINESS AND EFFICIENCY, by Dr. C. A. Bonner, Superintendent, Danvers State Hospital, Massachusetts.

Tuesday, February 26, 4:30 p. m.

THE FORGOTTEN AGE OF CHILDHOOD, by Dr. Paul Hanley Furfey, Department of Sociology, Catholic University of America.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

ilar age that stood on ground regularly burned over.

Fire appears also to be beneficial to the soil itself, and to the grass that grows among the trees, and thus to the cattle that eat the grass. Unburned areas, to be sure, did have soil somewhat more porous than that in burned areas; but this advantage was offset by the better chemical condition of the burned-over soil. Burned-over soil produced twice as much green weight of vegetation, which was also of better nutritive quality than the plants from unburned areas. And cattle grazed in burned-over woods gained more weight and were sleeker-looking than comparison herds kept in fire-free woods.

However, lest Southern stockmen crow too easily over the "perfessers," it was noted that the common practice of burning the woods every spring is a bit too much of a good thing. Much less frequent use of fire is calculated to bring better results, in all probability. Tests of just how often the red demon can be invoked with benefit rather than harm are now in prospect.

Science News Letter, February 16, 1935

ARCHAEOLOGY

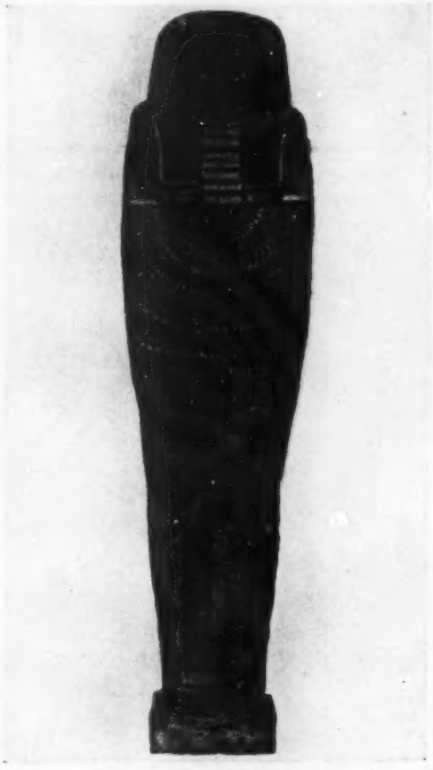
Egyptians Planned Their Own Funerals and Mummies

AN EGYPTIAN of the olden times took such interest in his own funeral that he conferred with undertakers about the trappings, plenty of time in advance.

If he should be suddenly taken off without planning the funeral, there was quite a risk that his mummy mask would not be a good likeness. And the sacred formula written on his coffin might not be aptly chosen for insuring greatest benefits after death. Relatives were not so critical of these matters.

Results of this old concern over funerals are vividly shown in a "mummy room," at the University Museum of the University of Pennsylvania. Many burial relics are exhibited for the first time since they were discovered by various archaeological exhibitions. The mummy of "So-and-So" is one exhibit which shows that undertakers were sometimes careless and ignorant, in times when education was at low ebb.

About 2200 B.C., an Egyptian funeral called for a "soul-house." These curious objects made of pottery resemble small doll houses, with rooms and pillared porches. Inside, the soul of the dead was expected to seek shelter, while consuming food offerings.



MUMMY OF "SO-AND-SO"

An Egyptian undertaker of small learning scrawled on this coffin, in the blank spaces, the prayers ordered by the customer. The name of the coffin owner quite stumped him, so he wrote "So-and-So."

A feature of funeral equipment in the Graeco-Roman period was a mummy-label. The Museum has a collection of these wooden labels, bearing the names of departed people of Egypt. Like some modern method of tagging babies in a hospital, the ancients of this period had tags tied to a mummy to identify it before placing it in the coffin.

Mummy portraits were a style of the Roman period in Egypt. These are almost the only examples of Roman painting in wax that have survived the ages. The wax portrait adorned the house of an individual during his lifetime, and after death the portrait was fastened over his face or put on the coffin, replacing carved wooden mummy masks of earlier times.

Science News Letter, February 16, 1935

Zuni Indian women of the Southwest are so used to balancing large pottery jars on their heads that some can even run without touching the jar with the hands.

ENTOMOLOGY

Winter in Midwest Leaves Chinch Bugs Ready For Ill

WEATHER conditions so far this winter have not been severe enough to discourage the widespread menace of the chinch bug, the Bureau of Entomology, U. S. Department of Agriculture, informed Science Service. During the latter part of January and the first days of February there was an almost continuous sheet of ice over Iowa, where the pest is expected to be at its worst next summer, but this probably did not have much effect on the hibernating insects, snug in their winter quarters among the roadside grasses. Unless beating rains come during the migrating period, in late spring and early summer, chinch bugs will be very bad over eastern Kansas, the northern half of Missouri and practically the whole of Illinois, as well as less extensively in several other states.

Grasshopper eggs also are numerous, with their greatest concentration in the western part of the wheat belt, farther west than the chinch bug area. They also are expected to be troublesome, though perhaps not so much so as they have been during the past two or three years. The Bureau of Entomology has some funds left over from last summer's campaign, and there are supplies for poison bait still in the field stations. These will be expended against the 'hoppers during the coming summer.

Science News Letter, February 16, 1935

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•First Glances at New Books

Zoology

INFANTS OF THE ZOO—E. G. Boulenger—*Dutton,* 144 p., plates, $2.50. Babies are always interesting to most people; and that goes even when (or perhaps especially when) the infants are penguins or porcupines, tapirs or tigers. Animal photographs by Boulenger, of course, need no blurb.

Science News Letter, February 16, 1935

Biology

BIOLOGY—Frederick L. Fitzpatrick and Ralph E. Horton—*Houghton Mifflin,* 611, xlv p., $1.76. A text for high school use, which first introduces the student to the problems which living things must solve, and then proceeds to show some of the various methods of solution.

Science News Letter, February 16, 1935

Science—Biography

A SCIENTIST IN THE EARLY REPUBLIC, SAMUEL LATHAM MITCHILL, 1764-1831—Courtney R. Hall—*Columbia Univ. Press,* 162 p., $2.50. The life story of a many-sided man of learning, who saw the new Republic born and assisted in its early development.

Science News Letter, February 16, 1935

Photography

ELEMENTARY PHOTOGRAPHIC CHEMISTRY—*Eastman Kodak Company,* 132 p., 50c. Compact text for the amateur which is companion book to several of the manuals on photography and taking pictures issued at various times by the same company. Worth having if one wishes to develop and print pictures.

Science News Letter, February 16, 1935

Science

REPORT ON THE PROGRESS AND CONDITION OF THE UNITED STATES NATIONAL MUSEUM FOR THE YEAR ENDED JUNE 30, 1934—*Govt. Print. Off.,* 108 p., 15c.

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Physics

EXPERIMENTAL PHYSICS, A SELECTION OF EXPERIMENTS—G. F. C. Searle—*Macmillan,* 363 p., $4.50. Dr. Searle has been demonstrator in physics at Cavendish Laboratory at Cambridge, England, since 1888. This book, to which he refers as his "Odds and Ends" book, is a collection of laboratory experiments in mechanics, elasticity, surface tension, viscosity, heat and sound. Dr. Searle ends his long career on Sept. 30 of this year. His present book offers his successors helpful hints on what must be done to take up his work at one of the most famous laboratories of the world.

Science News Letter, February 16, 1935

Economics

SOCIAL INTEGRATION—Robert Frank—*Christopher Publishing House,* 199 p., $1.75. The economic Utopia of the author presented in the form of "a brief fictional history of the United States during the period 1935-45."

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Botany

THE GRAMINEAE—Agnes Arber—*Cambridge Univ. Press,* 480 p., $8.50. A thorough-going treatise on practically all botanical aspects of the grasses, except the details of taxonomy: their history in botany and agriculture; morphology in great particular, by families; some aspects of ecology and genetics; 44 pages of bibliography. Not only specialists in agrostology but all botanists, especially teaching botanists, will want this book.

Science News Letter, February 16, 1935

Zoology

A STUDY OF THE LIFE HISTORY AND FOOD HABITS OF MULE DEER IN CALIFORNIA—Joseph S. Dixon—*California Fish and Game,* 146 p., 25c. Throughout the whole western group of National Parks and National Forests the mule deer is the one ubiquitous element in the large-mammal population. It is especially valuable to naturalists, therefore, to have a study of this kind available.

Science News Letter, February 16, 1935

Embryology

A HISTORY OF EMBRYOLOGY—Joseph Needham — *Cambridge Univ. Press,* 274 p., $4. Of textbooks setting forth the present state of knowledge in the highly important field of embryology there i no end, but there has been a real need for a full and connected story of present knowledge developed: the ontogeny of embryology, one might say. This need is now excellently satisfied: a scholarly and well documented text, with numerous illustrations taken from the classics of the science.

Science News Letter, February 16, 1935

Philosophy

I DO NOT KNOW—Samuel J. Blocker—*Meador Publishing Co.,* 164 p., $2. An experienced teacher here undertakes to set forth, for a non-scientific audience, a compact but comprehensive statement of how much we know, and—of even more importance—how much lies beyond that we do not yet know, and may be a very long time finding out. This backgrounds his reflections on the significances of scientific knowledge, and its relations to thought, faith, and other phases of mental life.

Science News Letter, February 16, 1935

Dairy Science

FUNDAMENTALS OF DAIRY SCIENCE—Associates of Lore A. Rogers—*Reinhold Publishing Corp.,* 616 p., $6. American Chem. Soc. Monograph No. 41. The second edition of one of the most useful and successful, because one of the most thorough-going, books in the field of dairying.

Science News Letter, February 16, 1935

Fiction

IN THE SEALED CAVE: A SCIENTIFIC FANTASY—Louis Herrman—*D. Appleton-Century,* 226 p., $2. Gulliver vists the modern Mousterians, living in caves on a small island near the port of Smyrna, and thus provides the narrative vehicle for discussions of problems of living, society, arts, biology, religion and morals.

Science News Letter, February 16, 1935

Medicine

THE BIOCHEMISTRY OF THE EYE Arlington G. Krause—*Johns Hopkins Press,* 264 p., $3.25. This monograph is a summary of what is now known of the biochemistry of the eye. It is of course far too technical for lay reading but will doubtless prove a valuable reference book for medical scientists.

Science News Letter, February 16, 1935

Engineering

PROCEEDINGS OF THE 37TH ANNUAL MEETING OF THE AMERICAN SOCIETY FOR TESTING MATERIALS: Vol. 34, Part 1, Committee Reports, New and Revised Tentative Standards, Tentative Revisions of Standards; Part 2, Technical Papers—Pub. by *The Society,* Vol. 1, 1325 p., Vol. 2, 943 p. Each part $5.50, paper cover; $6, cloth; $7, half leather.

Science News Letter, February 16, 1935

Chemistry

MARVELS OF MODERN CHEMISTRY. 2nd Ed.—Beverly L. Clarke—*Harper,* 374 p., $2.50. In the publisher's announcement this book is "a general survey of all phases of chemistry, clearly and simply told for the lay reader." Fulfilling such broad claims is a difficult task for any man, but Dr. Clarke does a good job of it. Thirteen pages of index in small type make the book a possible reference source for non-technical readers.

Science News Letter, February 16, 1935

Physics

ARISTOTLE, GALILEO, AND THE TOWER OF PISA—Lane Cooper—*Cornell Univ. Press,* 102 p., $1.50. The author, who is professor of English Literature at Cornell, has traced out the library sources on the oft-mentioned masterful experiment of Galileo at the Tower of Pisa. The truth of the historic test seems to be that Galileo performed not one single, startling experiment but worked on the research for many months, repeating it again and again.

Science News Letter, February 16, 1935

Medicine

CLINICAL LABORATORY METHODS—Pauline S. Dimmitt—*A. Davis,* 156 p., $2. A handbook for medical students, internes and laboratory technicians.

Science News Letter, February 16, 1935

Lapidary

GEMS, HOW TO KNOW AND CUT THEM—H. L. Thomson—*Pub. by author, Los Angeles,* 26 p., 50c. Information for the layman on what makes gems valuable and other facts which everyone wants to know about precious stones.

Science News Letter, February 16, 1935

Mathematics

PROGRESSIVE PLANE GEOMETRY—Webster Wells and Walter W. Hart—*Heath,* 390 p., $1.36. High school text designed to fit the varied needs of any class in geometry. There is a minimum, more advanced and a very advanced course all given in the same volume.

Science News Letter, February 16, 1935

Chemistry

THE NITROGEN SYSTEM OF COMPOUNDS—Edward Curtis Franklin—*Reinhold Publishing Corp.,* 339 p., $7.50. An extensive summary of the nitrogen system of compounds and the way such compounds simulate in their properties and behavior the analogous compounds of oxygen. Thus, after water, ammonia is the one liquid which has an outstanding place among the solvents. And potassium amide—derivative of ammonia in the same sense that potassium hydroxide is a derivative of water—shows all the properties of a base. Acetamide too, as a nitrogen analog of acetic acid, behaves like acetic acid. In the same way the book traces out other systems starting with the basic substances like methane. Volume 68 of the Monograph Series of the American Chemical Society.

Science News Letter, February 16, 1935

Microscopy

POLARIZING MICROSCOPES—*Bausch & Lomb Optical Co., Rochester, N. Y.,* 24 p., free.

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Geography

OUR PLANET, THE BLUE BOOK OF MAPS—*C. S. Hammond & Co.,* 239 p., $5. A handy sized atlas plus a number of very attractive features, such as maps in historical perspective—France at different periods, Europe at different periods, ancient Athens, Rome, Jerusalem. Economic and population maps are another feature, and there are fact pages, such as a chronology of discovery voyages, which add to the interest and usefulness of the book.

Science News Letter, February 16, 1935

Chemistry

HANDBOOK OF CHEMISTRY—Comp. and ed. by Norbert A. Lange, Gordon M. Forker and Richard S. Burington—*Handbook Publishers,* 1265, 248, 29 p., $6; special price to students and teachers, $3. Entering the field now occupied by the widely used Handbook of Chemistry and Physics, Prof. Lange's volume concentrates on chemistry alone. The 1265 pages of information for chemists and those in other fields who want chemical facts are supplemented with 248 pages of mathematical appendix. Type style and size and the paper used in the printing make for easy reading.

Science News Letter, February 16, 1935

General Science

MASTERY TESTS IN GENERAL SCIENCE, SETS X AND Y—G. W. Hunter and R. A. Knapp—*American Book Co.,* Set X., 154 p., Set Y., 163 p., 40c. each.

Science News Letter, February 16, 1935

Botany

THE BOTANICAL REVIEW—Edited by H. A. Gleason and E. H. Fulling—*New York Botanical Garden,* Monthly, $3 a year in U. S. and Canada; $3.50 elsewhere. This new journal must be rated as one of the most significant of the additions to botanical literature within recent years. Its aim is not to present original contributions but rather to offer comprehensive summaries of recent progress in various fields of plant science. The papers presented in the first two numbers, by L. O. Kunkel, W. Seifriz, P. B. Sears and D. B. Anderson, set a standard that is at once an inducement to readers and a challenge to subsequent contributors.

Science News Letter, February 16, 1935

Astronomy

MEN, MIRRORS, AND STARS—G. Edward Pendray—*Funk and Wagnalls,* 339 p., $3. Usefully inclusive and with a strong historical slant, this popular book by the science editor of the *Literary Digest* tells of the growth of astronomy from its early beginnings, describes the instruments used in observatories, and looks into the future. Amateur telescope-makers have a chapter of their own. There are lists of the world's largest telescopes and observatories in North America and the Southern Hemisphere.

Science News Letter, February 16, 1935

Genetics

HEREDITY AND VARIATION—L. C. Dunn—*University Society,* 120 p., cloth, $1, paper, 65c. A brief text in the elements of genetics, suitable for college use or for the independent reader seeking general information.

Science News Letter, February 16, 1935

Zoology

THE SKELETAL MUSCULATURE OF THE BLUE CRAB, CALLINECTES SAPIDUS RATHBUN—Doris M. Cochran—*Smithsonian Institution,* 76 p., 35c.

Science News Letter, February 16, 1935

Bibliography—Nature Study

NATURE EDUCATION, A SELECTED BIBLIOGRAPHY—William Gould Vinal—*School of Education, Western Reserve Univ.,* 82 mimeographed leaves, 75c., plus postage.

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